IN THE CLAIMS:

Please cancel claims 1 – 9.

10. (New) A method of dynamically controlling and managing operating characteristics of a fuel cell system, including the steps of:

(A) providing a DC-DC converter circuit having an input connection to receive the output of a fuel cell, and connected to place a load across the fuel cell, said DC-DC converter circuit having internal switches that are operated at a duty cycle that is adjustable;

(B) providing a programmable controller that receives as an input, present and stored values of one or more operating characteristics, said programmable controller also being programmed to signal said DC-DC converter switches to adjust its duty cycle;

(C) dynamically determining a desired value for one or more operating characteristics of the fuel cell system, depending upon the operating conditions of the fuel cell system;

(D) monitoring one or more operating characteristics of said fuel cell system;

(E) calculating a new duty cycle for the associated DC-DC converter within the fuel cell system required to substantially achieve the desired value for one or more of said operating characteristics; and

(F) signaling said DC-DC converter to adjust its duty cycle to said new duty cycle.

11. (New) The method as defined in claim 10 including the further steps of:

(A) identifying a weakest cell in a fuel cell stack;

(B) measuring the output voltage of the weakest cell;

(C) dynamically determining a desired value for said output voltage;

(D) comparing a present value of said weakest cell output voltage with a desired value;

(E) calculating a new duty cycle for the associated DC-DC converter within the fuel cell system required to substantially achieve said desired value for the output voltage of the weakest cell; and

(F) signaling said DC-DC converter to adjust its duty cycle to said new duty cycle.

12. (New) The method as defined in claim 10 including the further step of:

(A) monitoring as said operating characteristic, stack output voltage;

(B) dynamically determining as said desired value, stack output voltage;

(C) comparing a present value of said stack output voltage with a desired value;

(D) calculating a new duty cycle for the associated DC-DC converter within the fuel cell system required to substantially achieve said desired value for the stack output voltage; and

(E) signaling said DC-DC converter to adjust its duty cycle to said new duty cycle.

13. (New) The method as defined in claim 10 including the further steps of:

(A) providing at least one battery associated with the output of said DC-DC converter circuit that is powered by the output voltage of the fuel cell;

(B) measuring as said operating characteristics, the voltage of the battery;

(C) determining whether said battery should be charged;

(D) calculating a new duty cycle for the associated DC-DC converter required to substantially achieve the desired voltage of said battery; and

(E) signaling said DC-DC converter to adjust its duty cycle to said new duty cycle.

14. (New) The method of controlling operating characteristics of a fuel cell as defined in claim 10 including the further steps of:

(A) monitoring as said operating characteristics, the output current of a fuel cell stack;

(B) dynamically determining as said desired value, the output current;

(C) comparing a present value of said output current with a desired value;

(D) calculating a new duty cycle for the associated DC-DC converter with the fuel cell system required to substantially achieve said desired value for the output current; and

(E) signaling said DC-DC converter to adjust its duty cycle to said new duty cycle.

15. (New) The method of controlling operating characteristics of a fuel cell as defined in claim 10 including the further steps of:

(A) monitoring as said operating characteristic, the output power of the fuel cell stack;

(B) dynamically determining as said desired value, the output power of the fuel cell stack;

(C) comparing a present value of said output power with a desired value;

(D) calculating a new duty cycle for the associated DC-DC converter within the fuel cell system required to substantially achieve said desired value for the output power; and

(E) signaling the DC-DC converter to adjust its duty cycle to said new duty cycle.

16. (New) A method of controlling a fuel cell system, including the steps of:

(A) dynamically determining desired values for a plurality of operating characteristics being monitored in a current mode of operation of a fuel cell system;

(B) measuring each of said selected operating characteristics;

(C) determining a duty cycle required to substantially achieve each individual desired value and storing each duty cycle;

(D) comparing stored values and selecting the minimum duty cycle; and

(E) using this duty cycle as the new duty cycle of the DC-DC converter circuit switches within said fuel cell system;

17. (New) The method as defined in claim 16 including the further step of:

periodically repeating determining the desired values and the measurements and updating the duty cycle.

18. (New) A method of measuring fuel cell concentration in a fuel cell system:

(A) identifying the weakest fuel cell in a fuel cell stack;

(B) increasing the overall stack output current until the voltage of the weakest fuel cell approaches zero;

(C) measuring the stack output current as a limiting current;

(D) determining whether concentration is too high or too low, based on the measured current value; and

(E) dosing additional fuel or water should a desired value not be met.

19. (New) A method of dynamically controlling and managing temperature in a fuel cell system, including the steps of:

(A) measuring the stack output voltage of the fuel cell system;

(B) determining whether the stack output voltage is at a desired value depending upon the present desired temperature range of the fuel cell system, for the present operating conditions, and

(C) adjusting the duty cycle of an associated DC-DC converter to change the output stack voltage to substantially the desired value.

20. (New) A method of dynamically controlling the output power of a fuel cell system including the steps of:

(A) dynamically determining a desired value for the output power of the fuel cell system, depending upon the present operating conditions of the fuel cell system;

(B) measuring the output power of the fuel cell system;

(C) if the desired value is not substantially met, measuring fuel cell concentration;

(D) adjusting fuel cell concentration to substantially achieve the desired value of the output power of the fuel cell system; and

(E) adjusting the overall stack voltage to substantially achieve the maximum output power of the fuel cell system.